# THE IMPACT OF COVID-19 ON

# EXERCISE MOTIVATION

By

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THE IMPACT OF COVID-19 ON EXERCISE

MOTIVATION AND ADHERENCE

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Go POKES!

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Abstract: The purpose of this study was to determine the impact of the COVID-19 pandemic on exercise motivation. The survey instrument used was the Markland and Ingledew (1997) Exercise Motivations Inventory-2 questionnaire. Of the 325 participants, 33.2% were male (n=108) and 66.8% were female (n=217). A retrospective pretest/posttest design was used. Individual *t*-tests were performed comparing each of the fourteen subscales of exercise motivation. Stress management, revitalization, health pressures, positive health, weight management, appearance, strength and endurance, and nimbleness all showed significant changes from pretest to posttest. Additionally, *t*-tests were performed comparing change in means for each subscale between genders. Stress management, enjoyment, challenge, and strength and endurance each showed significantly different change in means between genders. Results suggest that COVID-19 had a significant impact on exercise motivation.

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# CHAPTER I

# INTRODUCTION

## Statement of the Problem

Throughout much of history, the topic of physical exercise has been a potential discussion related to wellness. It has been widely recognized as a necessary and crucial component of living a healthy life. In general, for a healthy individual, more exercise leads to greater health benefits and fewer negative health outcomes (Fletcher et al., 2018). In recent years, sedentary behaviors have increased while exercise participation has decreased (Haskell, Lee, Pate, Powell, & Blair, 2007). As people grow older, many choose to fill their non-work time with sedentary behaviors instead of activities that promote exercise (Jones et al., 1998). That truth applies to American society as a whole but with different severity depending on the demographic. For instance, roughly half of college students in the United States fail to meet the minimum recommendations for exercise on a regular basis (American College Health Association, 2019). Similarly, females typically engage in less exercise than their male counterparts, especially during the college years (Buckworth and Nigg, 2004). Numerous reasons may explain the declining trends of exercise participation and a multitude of barriers may deter a person

from exercising. However, there can also be multiple factors that serve to motivate a person to exercise.

In order to determine the effects of the relationship between exercise and wellness, the United States Surgeon General commissioned an investigation in 1994 (Department of Health and Human Services, 1996). The Centers for Disease Control and Prevention (CDC) functioned as primary researchers for the investigation. The CDC recruited multiple major health organizations in the United States including: President's Council on Physical Fitness and Sports; Office of Public Health and Science; Office of Disease Prevention; National Institutes of Health (and corresponding institutes); American Alliance for Health, Physical Education, Recreation, and Dance; American College of Sports Medicine; and the American Heart Association (HHS, 1996). The organizations worked together to compile data focused on the increased positive health benefits and decreased negative health outcomes associated with exercise participation or the lack of exercise participation. After two years collecting and analyzing the available data, the 1996 Surgeon General's report was released to the public. Some of the major conclusions cited in the report are:

- Regardless of age, gender, or ethnicity, everyone can benefit from moderate exercise.
- Increasing the time or intensity of exercise can lead to even greater healthy benefits.
- Exercise decreases the risk of premature mortality as well as many chronic diseases.
- Physical activity can improve mental health.

- Over 60% of adults (>22 years) do not meet recommended guidelines for physical activity while 25% of adults do not participate in any regular physical activity.
- Roughly 50% of youth (12-21 years) do not participate in regular vigorous activity.
- Physical activity declines greatly during adolescence (HHS, 1996).

In addition to the major conclusions found in the report, many other findings were cited. Among those are the major positive effects that physical activity has on the cardiovascular and musculoskeletal systems as well as considerable positive effects on the metabolic, endocrine, and immune systems. The authors also discussed the diminishing effects of physical activity noting that a reduction in activity levels will lead to a reduction in health benefits (DHHS, 1996). In addition to the general systems benefits, the results show positive effects of physical activity on several health conditions (see Table 1).

Table 1.

*Effects of Activity Levels on Health Conditions (adapted from DHHS, 1996)*

| Activity Level | Association | Condition |
|---|---|---|
| Higher | Lower | Mortality rate |
| Higher | Lower | Cardiovascular diseases |
| Regular | Lower | Colon cancer risk |
| Regular | Lower | Non-insulin dependent diabetes risk |
| Regular | Lower | Fall risk in older adults |
| Lower | Higher | BMI |
| Regular | Higher | Physical & cognitive functioning |
| Regular | Lower | Depression risk |

## Exercise Motivation

As exercise trends have continued to decline in the decades since the 1996 Surgeon General's report, researchers have been searching for answers that could explain the downward trend (Gu, Zhang, & Smith, 2015). A primary predictor of whether or not a person will satisfy the minimum guidelines for exercise is motivation (D'Abundo, Sidman, Milroy, Orsini, & Fiala, 2014). Exploring and understanding the many different motivating factors that drive participation in exercise is critical to implementing successful exercise programs (Ingledew & Markland, 2008; D'Abundo, Sidman, Milroy, Orsini, & Fiala, 2014). Motivating factors are incredibly diverse and unique to the individual. Some people are motivated by extrinsic factors such as appearance or social interaction while others are motivated more by intrinsic factors such as ill-health avoidance or disease prevention. One motivating factor is not necessarily better or worse than another, just different.

Developing exercise programming focused on fulfilling various motivation factors is vital to exercise adherence (Jekauc, 2015). There are numerous exercise options and programming available to individuals. Exercise participation is available at home, outdoors, or in a local fitness center. Each of these environments offers unique benefits and may align better with certain motivating factors. Exercising at home offers great convenience in a very affordable, non-threatening, and comfortable environment. Exercising outdoors offers vast mental health benefits, affordability, and accessibility (Pasanen, Tyravainen, & Korpela, 2014). Fitness centers offer patrons a diverse array of equipment, programs, classes, and opportunities. Each of these three environments is

perfectly appropriate for exercise, especially if one environment helps an individual achieve success in their goals.

**Exercise and COVID-19**

Fulfilling the minimum guidelines for exercise can be difficult during the normal flow of life due to motivation factors and barriers including obligations such as jobs, school, or social interactions (Pels & Kleinert, 2016; Buckworth and Nigg, 2004). However, during the COVID-19 pandemic, fulfilling those same guidelines became more difficult due to quarantines, facility closures, social distancing, and other health-risk implications (Chtourou et al., 2020). Stay-at-home orders forced people all over the world into new habits and routines (Jakobsson, Malm, Furberg, Ekelund, & Svensson, 2020). For people who already regularly exercised at home, this change may have little to no effect or been a welcome one. However, for those individuals who were accustomed to working out in an outdoor public space or a local fitness center, this change could be overwhelming (Matias, Dominski, & Marks, 2020). The COVID-19 pandemic forced a huge majority of people into a situation where exercising became much more difficult than prior to the changes.

People who do not have an exercise background and understand how to exercise without equipment, began purchasing fitness equipment at a rate that led most fitness companies to sell out of stock (Matias et al., 2020). For those individuals who were not fortunate enough to purchase equipment before it sold out, or for those individuals who could not afford to purchase any equipment, there may have been a feeling of inability to exercise. In the early months of the pandemic, many experts around the world recognized the trend of decreasing exercise levels and began to make strong recommendations for

not only maintaining previous exercise levels but also pursuing higher levels if possible (Chtouru et al., 2020). These recommendations were based on the same ideas found in the 1996 Surgeon General's Report that increased levels of exercise are a strong defensive measure against ill-health conditions, which could include COVID-19. Even when it is difficult, it is vital to maintain healthy levels of physical exercise to combat ill-health and promote positive health outcomes (Vellers et al., 2020).

**Health Belief Model**

To better understand exercise motivation and adherence, the Health Belief Model will be utilized through this research project. This model provides an overview of multiple intrinsic and extrinsic motivation and adherence factors that can be tested in light of the changes due to the pandemic.

Originally developed in the 1950's by social psychologists working for the U.S. Public Health Service, the Health Belief Model is intended to address the failing adherence rates of people within health prevention and promotion programs (Glanz, Rimer, & Lewis, 2008). The model evolved over the years to include peoples' responses to symptoms and their behaviors in response to medical diagnoses (Rosenstock, 1974). Like many theories, it is built around a set of constructs that guide understanding and application. Six primary concepts and constructs comprise the Health Belief Model:

- Perceived susceptibility- belief regarding chance of contracting illness,
- Perceived severity- seriousness of conditions and consequences,
- Perceived benefits- belief in the efficacy of advised actions,
- Perceived barriers- the tangible and psychological cost of and barriers to doing the advised action,
- Cues to action- strategies intended to activate readiness to action,

- Self-efficacy- confidence the person has to take effective action (Rosenstock, 1974).

These six constructs include motivation and adherence factors that fit within the 6 constructs and were tested in this research project as to the effects of COVID-19 pandemic on exercise.

**Purpose**

The purpose of this study was to determine the impact of the COVID-19 pandemic on exercise motivation. Exercise is a critical component of living a healthy life. Despite that truth, many people struggle with finding the proper motivation to engage in regular exercise behaviors. The COVID-19 pandemic and its many limiting factors may have exacerbated that struggle for many individuals. However, it is also possible that the severity of the pandemic helped other individuals find the right motivating factors to fulfill the minimum standards for exercise. It is hypothesized herein that the COVID-19 pandemic made an impact on exercise motivation and adherence levels overall.

RESEARCH QUESTIONS

1. Did the COVID-19 pandemic influence primary exercise motivation factors?
2. Did respondents with similar motivation factors share any other characteristics?

HYPOTHESES

*Null Hypotheses*

1. The COVID-19 pandemic did not influence primary motivation factors.
2. The COVID-19 pandemic did not influence groups' motivation factors differently.

*Alternate Hypotheses*

1. The COVID-19 pandemic influenced primary motivation factors.

2. The COVID-19 pandemic influenced groups' motivation factors differently.

**Significance of Study**

Exercise levels are widely recognized as a primary predictor of overall health outcomes. Research suggests that higher levels of exercise lead to better health outcomes while lower levels of exercise lead to negative health outcomes (Miller, & Street, 2019). Even though exercise is widely regarded as an important and healthy behavior, a large percentage of people do not meet the minimum guidelines recommended by health experts (Czech, Melton, Biber, & Wittenberg, 2018). A primary factor that influences whether an individual engages in exercise behaviors may be recognition of their unique motivating factors. Secondarily, those motivating factors help to not only initiate exercise behaviors but also adhere to them over time. A deeper understanding of how the COVID-19 pandemic influenced exercise motivation and adherence could help exercise professionals encourage and promote healthy lifestyles for a greater number of people during times of significant public health events as well as during normal times.

LIMITATIONS

1. Subjects' answers were subjective based on their impressions.
2. Subjects are limited to users of the Oklahoma State University Colvin Recreation Center.
3. Subjects must answer questions regarding motivation factors from before COVID19.

ASSUMPTIONS

1. Subjects will completely read and answer the questions being asked.
2. Subjects completed the survey honestly and accurately.
3. The survey instruments were valid and reliable.

OPERATIONAL DEFINITIONS

1. Physical activity- any bodily, musculoskeletal, movement that results in a substantial increase in energy expenditure/caloric requirements over resting energy expenditure (ACSM, 2013)
2. Exercise- physical activity consisting of planned, structured, and repetitive bodily movement done to improve and/or maintain one or more components of physical fitness (ACSM, 2013)
3. Motivating factors- the primary factors that encourage an individual to engage in exercise behavior
4. Exercise adherence- the rate and consistency at which an individual completes an exercise regimen
5. Exercise Motivation Inventory-2 (EMI-2)- means of assessing a broad range of exercise participation motives in adult males and females, applicable to both exercisers and non-exercisers (Markland & Ingledew, 1997).

# CHAPTER II

# REVIEW OF THE LITERATURE

As indicated in previous research studies, individuals who participate in regular exercise are more likely to experience more positive health outcomes and fewer negative health outcomes (Ruegsegger & Booth, 2018; Fletcher, Landolfo, Niebauer, Ozemek, Arena, & Lavie, 2018; Jekauc, 2015). Health and wellness practitioners understand the benefits of exercise but must offer programming that aligns with numerous motivational factors (Gu, Zhang, & Smith, 2015; Jekauc, 2015). Exercise program development and implementation became more difficult but also more worthwhile during the COVID-19 pandemic (Chtourou et al., 2020; Matias, Dominski, & Marks, 2020; Jakobsson et al., 2020). In addition to program development issues caused by the pandemic, participant motivation to exercise may have been affected. An individual's adherence to an exercise program may have also been affected by the pandemic and is strongly linked to their motivational factors (Bebeley, Yi-gang, & Liu, 2015; Ingledew & Markland, 2008).

## Exercise Guidelines

The minimum recommendations for exercise are the benchmarks that identify the amount of exercise that a healthy person needs. The American College of Sports Medicine (ACSM) developed and regularly updates the most commonly used guidelines

for exercise. According to ACSM (2017), exercise is measured based on the four factors of the FITT principle. The first factor considered in measuring exercise is frequency. Frequency refers to the number of times per week that a person regularly engages in exercise. The minimum recommendation for a healthy individual is at least five days per week of moderate exercise or at least three days per week of vigorous exercise. The second factor considered in measuring exercise is intensity. Intensity refers to the level of physical exertion required for the bout of exercise. Moderate exercise for a healthy individual is defined as an average effort level between 40% and 60% of heart rate reserve. Vigorous exercise for a healthy individual is defined as an average effort level between 60% and 90% of heart rate reserve. Heart rate reserve is a metric that considers a person's resting heart rate when determining heart rate training zones. The third factor considered in measuring exercise is time. Time refers to the number of minutes engaged in a single bout of exercise. The minimum recommendation for a healthy individual is at least thirty to sixty minutes per day of moderate intensity exercise or twenty to sixty minutes per day of vigorous intensity exercise. The final factor considered in measuring exercise is type. Type refers to the mode of exercise such as running, cycling, or swimming. The minimum recommendation for a healthy individual is any rhythmic, aerobic exercise of at least moderate intensity (ACSM, 2017). When considering if an individual is meeting the minimum recommendations for exercise, these guidelines by ACSM are commonly the standard that is used (Debska, Mynarski, Biernat, Nawrocka, & Bergier, 2019).

**Effects of Exercise**

The ACSM guidelines are set forth to encourage people get the benefits of regular exercise. The effects of exercise on the body are vast. Exercise has a profound impact on positive health outcomes across the domains of physical, mental, and social health (Shvedko, Whittaker, Thompson, & Greig, 2018). The most commonly associated effects of exercise are those associated with physical health (Ruegsegger & Booth, 2018). Exercise is linked to improved body composition, improved cardiovascular fitness, and improved quality of life through better movement efficiency (Fletcher et al., 2018; Ruegsegger & Booth, 2018; Shvedko et al., 2018; Al-Eisa et al., 2016). The benefits of exercise on physical health also include prolonged life span, avoidance of chronic conditions, and delayed progression of disease (Ruegsegger & Booth, 2018). Most notably, an insufficient level of exercise is one of the leading modifiable risk factors associated with a higher risk of death worldwide (Fletcher et al., 2018). People who meet the minimum guidelines for exercise are roughly 20%-30% less likely to encounter preventable death than those who do not meet the minimum guidelines for exercise (Katzmarzyk, Lee, Martin, & Blair, 2017).

Research suggests that the positive effects of exercise participation extend further than physical health (Passmore, Cho, Lindenmeier, & Dao, 2018). Several mental health benefits are strongly associated with exercise (Shvedko et al., 2018). A recently recognized effect of exercise on mental health is its promotion of psychological homeostasis (Matias et al., 2020). Matias, Dominski, and Marks (2020) describe psychological homeostasis as the regulation by mind and body of cognition, affect, chronic stress, and subjective well-being. Exercise, especially when performed in public

settings, can have positive effects on reducing feelings of isolation and loneliness (Chtourou et al., 2020). In addition to mental health benefits, regulation of exercise habits is guided by the mental awareness of positive or negative health behaviors, also known as health consciousness (Pu, Zhang, Tang, & Qiu, 2020). This mental awareness of how positive or negative health behaviors contribute to broader health outcomes is foundational to the Health Belief Model.

**Health Belief Model**

There are six primary concepts and constructs that comprise the Health Belief Model. The first is perceived susceptibility which refers to one's beliefs regarding the chance of contracting a detrimental health condition (Glanz, Rimer, & Lewis, 2008). Practically speaking, perceived susceptibility helps to define at-risk populations, personalize the risk of those populations, and make perceived susceptibility more consistent with an individual's actual risk of developing a chronic condition like cardiovascular disease. The second is perceived severity which refers to one's beliefs of how serious a condition and its medical and social consequences are if contracted and/or left untreated (Glanz, Rimer, & Lewis, 2008). Perceived severity is important because it provides the context of the specific consequences associated with a particular health condition such as the increased risk of premature death associated with cardiovascular disease. Perceived susceptibility and severity are often combined and referred to as the perceived threat. The third construct is perceived benefits which refers to one's beliefs in the efficacy of an advised action to reduce risk or severity of impact (Glanz, Rimer, & Lewis, 2008). Perceived benefits can be defined as how, where, when, and which action should be taken, as well as clarifying the positive effects that can be expected.

The fourth primary concept is perceived barriers, which refers to one's beliefs regarding the tangible and psychological costs of the advised action. An example of this is the lack of a fitness center in an area of town may result in a person perceiving a lack of access barrier (Glanz, Rimer, & Lewis, 2008). Identifying perceived barriers and how to reduce them can be accomplished through reassurance, correction of misinformation, incentives, education, and assistance. In the lack of a fitness center in town, reducing the perceived barrier may be accomplished by building a fitness center, access to a private club at a reduced rate, and/or education the people on exercise that does not require a fitness center. The fifth construct is cues to action which refers to strategies intended to activate one's readiness (Glanz, Rimer, & Lewis, 2008). Cues to action is applied by providing how-to information, promoting awareness, and developing reminder systems. These cues to action can be as simple as setting daily alarms as reminders to achieve 60 minutes of physical activity, or more complex, creating videos to station at exercise machines showing how to use them. The final construct is self-efficacy which refers to one's confidence in the personal ability to take effective action (Glanz, Rimer, & Lewis, 2008). It is vital to improve self-efficacy by providing training and guidance on the intended action, employing progressive goal-setting, using verbal reinforcement, demonstrating desired behaviors, and reducing anxiety (Glanz, Rimer, & Lewis, 2008).

**The Health Belief Model in Exercise**

The model has deep roots in the health education and promotion industry as well as the exercise, wellness, and recreation facilities due to it being so strongly correlated to health risk and behavior change (Schunk, D.H., 2012). The model is widely regarded as one of the best options for explaining a person's health behaviors and the decisions that

inform those behaviors (Taylor, 2012). Research and applied programming based on the Health Belief Model has been conducted for decades and applied to a wide range of health and wellness concepts (see Table 2).

Table 2

*Applications of the Health Belief Model*

| **Application** | **Source** |
|---|---|
| Predicting preventative dental care | Ronis, 1992 |
| Breast self-examination | Champion, 1990 |
| Dieting for obesity | Uzark, Becker, Dielman, & Rocchini, 1987 |
| AIDS risk-related behaviors | Aspinwall, Kemeny, Taylor, Schneider, & Dudley, 1991 |
| Participation in a broad array of health screening programs | Becker, Kaback, Rosenstock, & Ruth, 1975 |
| Osteoporosis prevention | Turner, Hunt, DiBrezzo, Jones, 2004 |
| Identifying healthy behaviors in older adult women | Fitzgerald, Singleton, Neale, Prasad, & Hess, 1994 |
| Explaining health behaviors of myocardial infarction patients | Al-Ali & Haddad, 2004 |
| Compliance with a coronary heart disease program | Mirotznik, Feldman, & Stein, 1995 |
| Drinking and smoking intentions among adolescents | Goldberg, Halpern-Felsher, & Millstein, 2002 |

## Exercise Trends

In the years since the Surgeon General's report in 1996, many studies have examined different trends in exercise using multiple theories including the Health Behavior Model. Among those numerous studies, several have specifically focused on exercise trends of college students. One such study was an analysis of exercise behaviors and differing trends among age groups in the United States (Haskell, Lee, Pate, Powell, & Blair, 2007). Haskell et al. (2007) researched and analyzed data from reports published by the Centers for Disease Control and Prevention to determine what age groups in the United States were meeting the minimum recommendations of exercise from the ACSM and the American Heart Association (AHA). Their findings were consistent with the Surgeon General's 1996 report and showed that exercise decreases with age, especially during late adolescence or the college years. Haskell et al. (2007) found that roughly 60% of college aged adults in the United States met the minimum recommendations for exercise on a regular basis.

Another study was performed as a follow-up to the 1996 Surgeon General's report with the purpose of determining the relationship between exercise and sedentary behaviors in American college students (Buckworth & Nigg, 2004). This study included 493 students who were randomly selected from general requirement classes. The participants were evenly distributed across the four academic classes: freshman, sophomore, junior, and senior. In this study, students completed three different surveys which were then compiled to analyze for trends. The authors found that, during the college years, males were more engaged in exercise than females. Additionally, the authors found that exercise levels significantly decreased from one academic class to the

next. The impact of age on exercise engagement was more significant in females than males. The authors did not offer any possible reasons for the trends but did note that all three trends were consistent with literature reviewed for the study (Buckworth & Nigg, 2004).

Every year, the American College Health Association partners with dozens of colleges and universities across the nation to administer the National College Health Assessment (NCHA). The NCHA is a comprehensive survey of health behaviors, attitudes, beliefs, and habits. Colleges and universities can choose to participate in the testing administration as often as they like and may do as at no cost with the NCHA. In 2019, the NCHA was administered to roughly 68,000 college students representing 98 campuses across the nation. The test is administered during the fall semester of the school year with results being analyzed and interpreted during the spring semester. The compiled data is made available in a master report the following fall that is made available to the public. The report for the 2019 NCHA indicated that roughly 44% of college students in the United States meet the minimum recommendations for exercise established by the ACSM. The report also notes a significant difference between males and females who meet the minimum guidelines with just over 50% of males and just under 42% of females meeting the minimum recommendations on a weekly basis. Additionally, the report notes that 44% of college students in the United States participate in zero vigorous exercise on a regular basis (ACHA, 2019).

In the years since the 1996 Surgeon General's report, numerous studies have been conducted and have confirmed the findings and trends noted in the report and supported the findings that collegiate males are more actively involved in exercise than collegiate

females (Haskell et al., 2017). Those studies also support that aging tends to correlate with decreasing exercise engagement. However, while trends remain consistent, the level of engagement has changed for worse since the original report was published. The Haskell et al. (2017) study showed that nearly 60% of college students met the minimum recommendations for exercise while the 2019 NCHA results showed that only 46% of college students met the minimum recommendations.

**Exercise Motivators**

In order to understand the downward trajectory in exercise habits of college students, one may need to understand the factors that motivate an individual to engage in exercise. Many studies have been conducted to examine the relationship between exercise motivators and these trends, especially the differences between males and females. One such study sought to determine the impact of motivators on a college student's decision to exercise (Ebben & Brudzynski, 2008). The authors included 1044 participants in the study, which administered multiple surveys to determine exercise patterns and motivating factors that impact those patterns. The participants were selected from physical education and exercise classes. Of the 1044 participants, 802 were determined to be regular exercisers. Those 802 exercisers reported their top two or three reasons for choosing to engage in an exercise routine were general health and maintain fitness, see Table 3.

Table 3

*Motives for Exercise (adapted from Ebben and Brudzynski, 2008)*

| **Response** | **Number / %** | **Response** | **Number / %** |
|---|---|---|---|
| General Health | 251 / 31.1% | Weight Maintenance | 108 / 13.5% |
| Maintain Fitness | 203 / 25.3% | Vigor | 106 / 13.2% |
| Stress Reduction | 192 / 23.9 % | Increased Self-Esteem | 98 / 12.2% |
| Enjoyment | 159 / 19.8 % | Increased Strength/Endurance | 94 / 11.7% |
| Feel good/better | 148 / 18.5% | Training for Sport | 73 / 9.1% |
| Attractiveness | 123 / 15.3 % | Preventative Health | 46 / 5.7% |
| Weight Loss | 112 / 14.0% | Lifestyle/Habit | 41 / 5.1% |

The authors discuss the importance of understanding why a college student chooses to be a regular exerciser as being critical to some fields of study and the general student population. However, understanding the primary motivating factors for exercise can possibly help when developing interventions and programs targeted at increasing exercise behaviors of college students (Ebben & Brudzynski, 2008). However, developing the interventions and programs based solely on the top motivating factors for college students as a whole might not be the best option. Other research has been conducted that shows significant differences between the factors that motivate males to exercise compared to the factors that motivate females to exercise. Therefore, it may be crucial that these differences be accounted for to maximize the effectiveness of an intervention strategy (Ebben & Brudzynski, 2008).

Smith, Handley, and Eldredge (1998) conducted a study to examine the different reasons why males and females choose to workout. In this study, 178 college students completed three separate questionnaires all targeting exercise motivation: Reasons for

Exercise Inventory, Body Areas Satisfaction Scale, and the Situational Inventory of Body-Image Dysphoria. The authors found several significant results during data analysis. First, the results showed that collegiate males exercise more frequently than collegiate females. Second, the results showed that collegiate males reported exercising for improved health and fitness significantly more than any other motivating factor. Third, the results showed that collegiate females reported exercising for weight management or appearance significantly more than any other motivating factor. Fourth, the results showed that the only motivating factor significantly linked to increasing exercise frequency in collegiate females was high body distress. Each of these findings is congruent with other research on the differences in motivating factors for exercise between genders (Smith, Handley, and Eldredge, 1998).

In a study of 205 college students, the Exercise Motivation Inventory-2 (EMI-2) was administered to examine motivating factors (Kilpatrick, Hebert, & Bartholomew (2005). The EMI-2 was developed in 1997 by Markland and Ingledew and is widely regarded as the most effective instrument at measuring an individual's motivating factors to exercise. The subscales of the EMI-2 include 14 factors (see Table 4).

Table 4

*Exercise Motivation Inventory-2 Subscales (taken from Markland & Ingledew, 1997)*

| Subscale | Example |
|---|---|
| Affiliation | To spend time with friends |
| Appearance | To look more attractive |
| Challenge | To give me to goals to work toward |
| Competition | Because I like trying to win in physical activities |
| Enjoyment | Because I enjoy the feeling of exerting myself |
| Health pressures | Because my doctor advised me to exercise |
| Ill-health avoidance | To prevent health problems |
| Nimbleness | To stay/become more agile |
| Positive health | To have a healthy body |
| Revitalization | Because it makes me feel good |
| Social recognition | To show my worth to others |
| Strength and endurance | To increase my endurance |
| Stress Management | Because it helps reduce tension |
| Weight Management | To stay slim or add muscle |

Kilpatrick, Hebert, and Bartholomew (2005) found several significant results of the EMI-2. Respondents in the study ranked the fourteen motivating factors in order of importance from 1-14. When analyzing the entire sample, they found that the top motivating factors, which were significantly higher than the rest, were ill-health avoidance, positive health and appearance. When analyzing the differences between the genders, the authors found that challenge, competition, social recognition, and appearance were all significantly higher in males than in females. Furthermore, the authors found that weight management was significantly higher in females than in males (see Table 5). These findings are consistent with other research and suggest the need for interventions targeted at each gender separately based on the significantly different motivating factors for exercise (Kilpatrick, Hebert, & Bartholomew, 2005).

Table 5

*Exercise Motivation Inventory-2 Scores (taken from Kilpatrick, Hebert, & Bartholomew, 2005)*

| Subscale | Men | Women | Total |
|---|---|---|---|
| Affiliation | 13 | 11 | 13 |
| Appearance | 3 | 3 | 3 |
| Challenge | 9 | 10 | 10 |
| Competition | 6 | 13 | 11 |
| Enjoyment | 7 | 9 | 9 |
| Health pressures | 14 | 12 | 14 |
| Ill-health avoidance | 5 | 5 | 5 |
| Nimbleness | 4 | 8 | 7 |
| Positive health | 2 | 1 | 1 |
| Revitalization | 8 | 6 | 6 |
| Social recognition | 12 | 14 | 12 |
| Strength and endurance | 1 | 4 | 2 |
| Stress Management | 11 | 7 | 8 |
| Weight Management | 10 | 2 | 4 |

In a 2011 study examining the influence of age, sex, and race on exercise motivation factors, 2,214 college students completed the EMI-2 questionnaire. Much like previous research, significant results were found demonstrating a difference between males and females for exercise motivators (Egli, Bland, Melton, and Czech, 2011). Regarding the top three motivating factors for the entire sample, the factors were the same as in the Kilpatrick, Hebert, and Bartholomew (2005) study but in a different order. In this study, positive health was first, ill-health avoidance was second, and appearance was third. While there were some slight differences in these two studies, the results are very similar overall (see Table 6). The consistency of the results with those of previous studies led the authors to note the critical importance of developing separate interventions for collegiate males and females in order to maximize the effectiveness of improving exercise habits (Egli, Bland, Melton, and Czech, 2011).

Table 6

*Exercise Motivation Inventory-2 Scores (Egli, Bland, Melton, and Czech, 2011)*

| Subscale | Men | Women | Total |
|---|---|---|---|
| Affiliation | 12 | 11 | 12 |
| Appearance | 6 | 3 | 3 |
| Challenge | 9 | 10 | 10 |
| Competition | 7 | 12 | 11 |
| Enjoyment | 5 | 9 | 8 |
| Health pressures | 14 | 14 | 14 |
| Ill-health avoidance | 4 | 5 | 5 |
| Nimbleness | 3 | 7 | 6 |
| Positive health | 2 | 1 | 1 |
| Revitalization | 8 | 8 | 7 |
| Social recognition | 13 | 13 | 13 |
| Strength and endurance | 1 | 4 | 2 |
| Stress Management | 10 | 6 | 9 |
| Weight Management | 11 | 2 | 4 |

**Barriers to Exercise**

Understanding motivating factors and targeting interventions is based on one aspect of understanding, however, this does not account for potential barriers to exercise. An individual can be highly motivated to engage in an exercise regimen but if there are too many perceived and/or real barriers in the way, then the chances of that person following through with the exercise regimen are decreased. The aforementioned study by Ebben and Brudzynski did not only analyze the motivating factors of regular exercisers but it also analyzed potential barriers to exercise for college students. After asking the regularly exercising college students why they exercise, the study authors then asked the group what barriers stood in the way of them exercising more. The overwhelming top response with nearly half of the 802 responses was “more time” followed by “less school-work” and then “more motivation”. For the students in the sample who were not classified as regular exercisers (N= 240), they were also asked two questions. The first

was what barriers prevented them from engaging in a regular exercise regimen. The top three responses were “no time” with 70% of the responses, “laziness” with 20.4% of the responses, and “other priorities” with 18% of the responses. The final question of the study combined motivation and barriers into one response as it asked what would lead them to begin a regular exercise regimen. The top three response were “more time”, a “workout partner/group”, or “fewer demands”. Examining the responses from each of the questions shows that “time” is the number one barrier for a significant majority of college students (Ebben & Brudzynski, 2008). However, the authors suggested that since it is not possible to multiply or add time to a person’s day, interventions must be intentional about minimizing the time commitment required of participants (Ebben & Brudzynski, 2008).

**Exercise Interventions**

A more recent study examined the impact of barriers to exercise on college students’ exercise habits and which interventions are most successful at overcoming those barriers (Higgins, Middleton, Winner, Janelle, and Middleton, 2014). This study was a meta-analysis of collegiate exercise research. The most significant factor identified among all of the studies that impacts success of an exercise intervention on a collegiate population was self-efficacy. Self-efficacy describes a person’s confidence in his or her ability execute the specific actions necessary to achieve certain outcomes (Bandura, 1997). Analysis of the studies on exercise interventions showed that in order to achieve lasting change, self-efficacy must be targeted and cultivated. In other words, as an individual becomes more comfortable exercising and develops confidence in the ability to exercise, the person is much more likely to create behavioral life changes.

In addition to self-efficacy as a key component of intervention development for exercise, the Higgins et al. (2014) meta-analysis showed that one must also consider the environment of the intervention. To increase the effectiveness of exercise interventions, plans should target exercising in one's "typical" environment. If the intervention requires the individual to move too far outside of their common environments or their "bubble", then the chances of them sticking with a plan decrease. The final notable trend found in the study showed that exercise interventions should focus on exercise free of supervision (Higgins et al., 2014). The more that the persons learn to exercise on their own, the more their self-efficacy shows to increase. When an individual becomes too dependent on another person to exercise, the risk increases that the exercise regimen will stop as soon as the other person is removed (Higgins et al., 2014).

**Exercise and COVID-19**

The early months of 2020 saw a massive surge in COVID-19 diagnoses, hospitalizations, and even deaths (WHO, 2020). As hundreds of thousands of people around the world contracted the disease, local, state, and federal governments began issuing multiple guidelines and regulations in an attempt to slow the spread of the disease. In most areas, these guidelines and regulations included stay-at-home, quarantine, and mask requirements (Centers for Disease Control and Prevention [CDC], 2020). All of the unprecedented orders created a ripple effect on daily life with roughly 4 billion people living in isolation (Sandford, 2020). Many people experienced a decrease in exercise and an increase in sedentary behavior, as well as myriad other physical and mental health problems (Pu et al., 2020).

Months into the global pandemic, researchers, health care experts, and medical practitioners realized the profound impact that COVID-19 was having on the overall wellbeing of people (Chtourou et al., 2020; Jakobsson et al., 2020; Pu et al., 2020; Matias et al., 2020). In order to determine the extent of COVID-19's impact on the physical, emotional, and mental wellbeing, studies were conducted on those with a positive diagnosis as well those impacted by an unprecedented shut down of the global economy. One of the greatest predictors of the severity of symptoms as well as COVID-19 related mortality, is obesity and its comorbidities (Kaux & Francaux, 2020). Through previous research, it is known that physical activity is the strongest controllable factor in preventing obesity. Therefore, the decreased physical activity levels associated with the COVID-19 shutdown increased the likelihood of obesity which then increased the potential symptomology and mortality rate of COVID-19 exposure (Jakobsson et al., 2020; Jimenez et. Al, 2020). Overall, research suggests that staying physically active is equally important during the COVID-19 global pandemic as it is during normal years (Chtourou et al., 2020; Ferreira, Irigoyen, Consolim-Colombo, Saraiva, & Angelis, 2020).

The early months of the COVID-19 pandemic were marked by the most significant shutdown of businesses and public places. Fortunately, many businesses and public places would slowly reopen as local governments lifted restrictions. However, fitness centers and public parks which are common destinations for people seeking to participate in physical exercise were not reopened quickly in many locales (CDC, 2020). This several month period of no access to preferred fitness environments greatly contributed to declining physical activity levels (Jakobsson et al., 2020). Furthermore,

research suggests that the body rapidly responds to periods of physical activity, and lack of physical activity, with significant metabolic and immunological changes (Bowden Davies et al., 2018). Even when fitness centers and public parks reopened, many people did not return to regular exercise habits in public places due to fear of contracting COVID-19 (Matias et al., 2020). As the COVID-19 pandemic approached a full year since the first diagnosis, many people found themselves a full year removed from the last time that they participated in physical exercise. Therefore, it may have become increasingly more critical that safe exercise interventions be developed to motivate people to return to exercise habits or pick them up for the first time.

**Conclusion**

The decades since the release of the 1996 Surgeon General's report have been full of various research on exercise. Many of the studies during that time have been focused on the exercise habits and trends of college students. Not only are college students a convenient sample group for university-based researchers but they are also in the middle of what research identifies as a time of significant drop-off in exercise activity. Much of the research performed in recent years has confirmed the findings of the 1996 report, identified new trends in college-aged exercise patterns, and also identified stark contrasts between genders in exercise. Acknowledging these exercise trends led to other research on various determinants of exercise such as motivators and barriers.

Understanding motivating factors may be key to developing exercise interventions as well as encouraging follow-through of the interventions. However, it may not be enough to simply acknowledge the top common motivating factors of exercise. It could be of critical importance to identify differing motivating factors of

groups like males and females. Within each gender group, significant trends exist that suggest that the majority of collegiate females exercise for similar reasons just like the majority of males do. Likewise, it could be crucial to identify potential barriers, both real and perceived, that might prevent someone from engaging in an exercise program.

The COVID-19 pandemic may have made determined people more determined, while providing a reason for some to be unmotivated. It is also possible that other shifts may occur. The COVID-19 pandemic may have encouraged some individuals to change motivation and perception of barriers. The changes in daily life and the realities that accompany the pandemic may have increased, decreased, or shifted exercise motivation, barriers, and patterns of many individuals. Learning more about these concepts could help the understanding of exercise motivation, barriers, and patters during times of restriction as well as providing more insight into “normal” times.

# CHAPTER III

# METHODOLOGY

## Purpose

The purpose of this study was to explore the impact of the COVID-19 pandemic on exercise motivation and adherence. More specifically, the research questions are:

1. Did the COVID-19 pandemic significantly influence primary exercise motivation factors?
2. Did respondents with similar motivation factors share any other characteristics?

## Independent and Dependent Variable

The independent variable was the COVID-19 Pandemic. The dependent variable was the motivating factors that drive a person to participate in physical exercise. These motivating factors were divided into fourteen subscales according to the Kilpatrick, Hebert, and Bartholomew (2005) study: affiliation, appearance, challenge, competition, enjoyment, health pressures, ill-health avoidance, nimbleness, positive health, revitalization, social recognition, strength and endurance, stress management, and weight-management. The dependent variable was categorical as subjects ranked the subscales in order of influence on personal exercise motivation.

**Hypothesis for Research Question 1:** Did the COVID-19 pandemic significantly influence primary exercise motivation factors?

$H_1$: The COVID-19 pandemic significantly influenced primary motivation factors in respondents.

$H_{1-0}$: The COVID-19 pandemic did not significantly influence primary motivation factors in respondents.

**Hypothesis for Research Question 2:** Did respondents with similar motivation factors share any other characteristics?

$H_2$: The COVID-19 pandemic influenced groups' motivation factors differently.

$H_{2-0}$: The COVID-19 pandemic did not influence groups' motivation factors differently.

**Participants**

The population for this study was male and female undergraduate students, graduate students, faculty, and staff from Oklahoma State University (OSU) who participated in fitness programs in the fall 2020 or spring 2021 academic semesters. The census of this population was identified through Fusion (CITE). Fusion is a registered facility management program of the Department of Wellness. Since sending the questionnaire to some or all persons in the population requires the same time, effort, and cost, a census instead of a sample was determined as the best method to collect the most responses.

A clear consensus does not exist among researchers regarding what percentage qualifies as an acceptable survey response rate (Riddick & Russell, 2015). High response rates are uncommon while below 50% is more common (Kerlinger & Lee, 2000). A

recent study showed that much debate exists as to what response rate eliminate any non-response bias (Fosnacht, Sarraf, Hower, & Peck, 2017). However, that same study concluded that there was no significant difference in unbiased population estimates between high and low response rates.

**Measurement**

The instrument used in this study was the EMI-2 (Markland & Ingledew, 1997). This questionnaire was developed as a means of assessing the differences in motivating factors that drive an individual to exercise. The EMI-2 (Appendix A) is comprised of 51 six-point Likert statements. Results of the questionnaire are grouped into 14 subscales; Stress Management, Revitalization, Enjoyment, Challenge, Social Recognition, Affiliation, Competition, Health Pressures, Ill-Health Avoidance, Positive Health, Weight Management, Appearance, Strength and Endurance, and Nimbleness (Markland & Ingledew, 1997). Responses to each exercise motivation statement are rated from (0) 'Not True For Me At All' to (5) 'Very True For Me'. Each of the 14 subscales corresponded with three or four of the 51 statements of the questionnaire. The EMI-2 is considered valid and reliable with Cronbach's alpha values between .69 and .92 for the fourteen subscales (Markland & Ingledew, 1997). For the purpose of this study, the statements of the EMI-2 were not modified. In addition to the EMI-2, basic demographic questions were asked to determine gender and classification in school.

For the purpose of this study, a retrospective pretest-posttest (RPP) design was utilized. Little et al. (2020) investigated the validity of the RPP design and found it to be a valid and trustworthy alternative to the traditional pretest-posttest design. The RPP is a repeated measures design that asks respondents to complete pretest questions

retrospectively in the same survey as the posttest questions. One modification was made to the format of the EMI-2 to allow for an RPP design. All 51 statements on the EMI-2 are preceded by the phrase "Personally, I exercise (or might exercise)…" (Markland & Ingledew, 1997). For the purpose of this study, two different phrases were added to achieve a retrospective pretest-posttest design. The pretest statements were preceded by "Prior to the COVID Pandemic, I exercised (or might have exercised)" and the posttest statements were preceded by "Since the start of the COVID Pandemic, I exercise (or might exercise)".

**Data Collection**

The study was approved by the Institutional Review Board (IRB) (Appendix B) on September 23, 2021. The survey was distributed through Qualtrics. Data collection began on September 28, 2021 and concluded on October 20, 2021. Estimated time for a respondent to complete the survey was 10 to 15 minutes.

An initial email (Appendix C) was sent to all individuals who participated in at least one fitness program during the academic semesters of fall 2020 and spring 2021. The initial email outlined the purpose and process of the study as well as a link to the survey. Three weeks was allotted for individuals to complete the survey. Once the individual clicked the link in the initial email, he/she navigated to the survey within Qualtrics. The opening page of the survey contained a "yes" or "no" question of voluntary agreement to participate in the study. If a respondent selected "no", he/she navigated to the final page of the survey which contained a brief "thank you" message. Each "no" response to the participation question was recorded. If a respondent selected

"yes", he/she navigated to the first page of the pretest survey. Respondents completed all 51 pretest questions before proceeding to complete all 51 of the posttest questions.

One week after the initial email was sent, a follow-up email (Appendix D) was sent to any individuals who had not yet completed the survey. Data will be stored, per IRB approval, for up to one year on a secure computer in 109 Colvin Center. Only the researcher had access to this computer and password. The IP addresses of respondents were not recorded and the anonymous link option was utilized within Qualtrics.

**Data Analysis**

After all of the data was collected, the responses to the 51 questions were manually evaluated and compiled into the 14 subscales of the EMI-2 according to the rubric (Appendix E) established by Markland and Ingledew (1997). Once all of the scores of the surveys were compiled according to the 14 subscales, data was entered into SPSS, and analyses were performed. Nominal data (gender and classification in school) were evaluated for frequency counts and descriptive statistics were reported. Fourteen separate *t*-tests were run comparing pre-post exercise motivation. Additionally, fourteen other *t*-tests were run comparing change in means between genders.

# CHAPTER IV

# RESULTS

The purpose of this study was to explore the impact of the COVID-19 pandemic on exercise motivation. The two research questions that directed the data analysis are:

(1) Did the COVID-19 pandemic significantly influence primary exercise motivation factors?

(2) Did respondents with similar motivation factors share any other characteristics?

## Response Rate

Of the 2,435 individuals who were invited to participate in the study, 481 responded to the questionnaire. All of the responses were exported from Qualtrics (2021) into SPSS. Of the 481 participants, 156 did not complete the questionnaire and were not

included in data analysis. Therefore, using the 325 completed questionnaires, the study had a 13% response rate. Of the 325 participants, 33.2% were male (n=108) and 66.8% were female (n=217).

## Analysis of Exercise Motivation Statements

The fourteen exercise motivations identified by Markland and Ingledew (1997) were measured on a six-point Likert scale from (0) 'Not at All True for Me' to (5) 'Very True for Me'. Each of the fourteen exercise motivation subscales corresponded with three to four statements designed to assess the specific motivation. The corresponding survey items as well as means for pre and post test scores for each subscale are below (see Tables 7-20).

Table 7

*Stress management items and means*

| Item | Pre | Post |
|---|---|---|
| To give me space to think | 3.02 | 3.19 |
| Because it helps to reduce tension | 3.26 | 3.48 |
| To help manage stress | 3.46 | 3.69 |
| To release tension | 3.23 | 3.57 |

Table 8

*Revitalization items and means*

| **Item** | **Pre** | **Post** |
|---|---|---|
| Because it makes me feel good | 3.90 | 3.87 |
| Because I find exercise invigorating | 3.13 | 3.19 |
| To recharge my batteries | 2.86 | 3.21 |

Table 9

*Enjoyment items and means*

| **Item** | **Pre** | **Post** |
|---|---|---|
| Because I enjoy the feeling of exerting myself | 4.46 | 4.39 |
| Because I find exercise satisfying in and of itself | 4.43 | 4.39 |
| For enjoyment of the experience of exercising | 4.22 | 4.29 |
| Because I feel at my best when exercising | 4.38 | 4.59 |

Table 10

*Challenge items and means*

| Item | Pre | Post |
|---|---|---|
| To give me goals to work towards | 4.19 | 4.33 |
| To give me personal challenges to face | 3.90 | 4.07 |
| To develop personal skills | 3.19 | 3.37 |
| To measure myself against personal standards | 3.79 | 3.88 |

Table 11

*Social recognition items and means*

| Item | Pre | Post |
|---|---|---|
| To show my worth to others | 2.46 | 2.42 |
| To compare my abilities with other peoples | 2.49 | 2.58 |
| To gain recognition for my accomplishments | 2.72 | 2.80 |
| To accomplish things that others are capable of | 2.97 | 3.00 |

Table 12

*Affiliation items and means*

| Item | Pre | Post |
|---|---|---|
| To spend time with friends | 2.90 | 2.85 |
| To enjoy the social aspects of exercising | 2.95 | 3.04 |
| To have fun being active with other people | 3.25 | 3.15 |
| To make new friends | 2.45 | 2.54 |

Table 13

*Competition items and means*

| Item | Pre | Post |
|---|---|---|
| Because I like trying to win in physical activities | 3.07 | 3.06 |
| Because I enjoy competing | 3.38 | 3.21 |
| Because I enjoy physical competition | 3.33 | 3.27 |
| Because I find physical activities fun especially when competition is involved | 3.44 | 3.36 |

Table 14

*Health pressures items and means*

| Item | Pre | Post |
|---|---|---|
| Because my doctor advised me to exercise | 1.72 | 2.10 |
| To help prevent an illness that runs in my family | 2.62 | 2.83 |
| To help recover from an illness/injury | 2.56 | 2.84 |

Table 15

*Ill-health avoidance items and means*

| Item | Pre | Post |
|---|---|---|
| To avoid ill-health | 4.27 | 4.32 |
| To prevent health problems | 4.34 | 4.39 |
| To avoid heart disease | 3.58 | 3.62 |

Table 16

*Positive health items and means*

| Item | Pre | Post |
|---|---|---|
| To have a healthy body | 5.12 | 5.21 |
| Because I want to maintain good health | 4.89 | 5.09 |
| To feel more healthy | 4.93 | 5.19 |

Table 17

*Weight management items and means*

| Item | Pre | Post |
|---|---|---|
| To stay slim | 4.15 | 4.25 |
| To lose weight | 3.85 | 4.10 |
| To help control my weight | 4.20 | 4.35 |
| Because exercise helps me to burn calories | 4.39 | 4.55 |

Table 18

*Appearance items and means*

| Item | Pre | Post |
|---|---|---|
| To help me look younger | 2.80 | 2.86 |
| To have a good body | 4.68 | 4.63 |
| To improve my appearance | 4.23 | 4.33 |
| To look more attractive | 3.96 | 4.06 |

Table 19

*Strength and endurance items and means*

| Item | Pre | Post |
|---|---|---|
| To build up my strength | 5.02 | 5.01 |
| To increase my endurance | 4.52 | 4.55 |
| To get stronger | 4.81 | 5.09 |
| To develop my muscles | 4.68 | 4.84 |

Table 20

*Nimbleness items and means*

| Item | Pre | Post |
|---|---|---|
| To stay/become more agile | 4.14 | 4.20 |
| To maintain flexibility | 4.12 | 4.19 |
| To stay/become flexible | 4.11 | 4.32 |

All responses were exported into SPSS and analyzed according to the answer key provided by Markland and Ingledew (1997) (Appendix B). Collective scores were summed for each individual for both the retrospective pretest fourteen subscales and the posttest fourteen subscales. Table 21 shows the aggregate scores for the pretest subscales and their rank of prevalence. Table 22 shows the aggregate scores for the posttest subscales and their rank of prevalence.

Table 21

*Pretest subscale scores and ranks*

| **Exercise Motivation** | **M** | **SD** | **Rank** |
|---|---|---|---|
| Pre Positive Health | 3.94 | 1.15 | 1 |
| Pre Strength and Endurance | 3.74 | 1.22 | 2 |
| Pre Enjoyment | 3.4 | 1.46 | 3 |
| Pre Stress Management | 3.29 | 1.39 | 4 |
| Pre Revitalization | 3.29 | 1.38 | 5 |
| Pre Weight Management | 3.12 | 1.37 | 6 |
| Pre Nimbleness | 3.07 | 1.37 | 7 |
| Pre Ill Health Avoidance | 3.02 | 1.38 | 8 |
| Pre Appearance | 2.94 | 1.26 | 9 |
| Pre Challenge | 2.77 | 1.4 | 10 |
| Pre Competition | 2.24 | 1.69 | 11 |
| Pre Affiliation | 1.95 | 1.47 | 12 |
| Pre Social Recognition | 1.7 | 1.28 | 13 |
| Pre Health Pressures | 1.33 | 1.17 | 14 |

Table 22

*Posttest subscale scores and ranks*

| Exercise Motivation | M | SD | Rank |
|---|---|---|---|
| Post Positive Health | 4.15 | 1.02 | 1 |
| Post Strength and Endurance | 3.87 | 1.1 | 2 |
| Post Stress Management | 3.49 | 1.42 | 3 |
| Post Revitalization | 3.42 | 1.37 | 4 |
| Post Enjoyment | 3.40 | 1.52 | 5 |
| Post Weight Management | 3.34 | 1.36 | 6 |
| Post Nimbleness | 3.20 | 1.39 | 7 |
| Post Ill Health Avoidance | 3.11 | 1.46 | 8 |
| Post Appearance | 3.07 | 1.31 | 9 |
| Post Challenge | 2.84 | 1.49 | 10 |
| Post Competition | 2.14 | 1.75 | 11 |
| Post Affiliation | 1.88 | 1.59 | 12 |
| Post Social Recognition | 1.71 | 1.47 | 13 |
| Post Health Pressures | 1.60 | 1.35 | 14 |

Fourteen separate *t*-tests were performed comparing pretest and posttest means for each of the subscales. Eight of the fourteen subscales showed significant change from pretest to posttest. The "health pressures" subscale changed from pretest ($M = 1.33$, $SD = 1.17$) to posttest ($M = 1.33$, $SD = 1.17$), $t(324) = -5.58$, $p < .001$. The "weight management" subscale changed from pretest ($M = 3.12$, $SD = 1.37$) to posttest ($M = 3.34$, $SD = 1.36$), $t(324) = -4.47$, $p < .001$. The "positive health" subscale changed from pretest

($M$ = 3.94, $SD$ = 1.15) to posttest ($M$ = 4.05, $SD$ = 1.02), $t$(324) = -3.97, $p$ < .001. The "stress management" subscale changed from pretest ($M$ = 3.29, $SD$ = 1.39) to posttest ($M$ = 3.49, $SD$ = 1.42), $t$(324) = -3.59, $p$ < .001. The "appearance" subscale changed from pretest ($M$ = 2.94, $SD$ = 1.26) to posttest ($M$ = 3.07, $SD$ = 1.31), $t$(324) = -2.59, $p$ < .05. The "strength and endurance" subscale changed from pretest ($M$ = 3.74, $SD$ = 1.22) to posttest ($M$ = 3.87, $SD$ = 1.1), $t$(324) = -2.39, $p$ < .05. The "nimbleness" subscale changed from pretest ($M$ = 3.07, $SD$ = 1.07) to posttest ($M$ = 3.20, $SD$ = 1.39), $t$(324) = -2.30, $p$ < .05. The "revitalization" subscale changed from pretest ($M$ = 3.29, $SD$ = 1.38) to posttest ($M$ = 3.42, $SD$ = 1.37), $t$(324) = -2.18, $p$ < .05. Table 23 reports the results of the fourteen $t$-tests.

Table 23

*Results of pretest and posttest comparisons*

| | M | SD | t | *df* | Sig. (2-tailed) |
|---|---|---|---|---|---|
| Stress Management | -0.20 | 1.01 | -3.59 | 324.00 | 0.00* |
| Revitalization | -0.12 | 0.96 | -2.18 | 324.00 | 0.03** |
| Enjoyment | -0.01 | 0.99 | -0.10 | 324.00 | 0.92 |
| Challenge | -0.07 | 1.02 | -1.18 | 324.00 | 0.24 |
| Social Recognition | -0.02 | 0.86 | -0.36 | 324.00 | 0.72 |
| Affiliation | 0.07 | 1.08 | 1.17 | 324.00 | 0.24 |
| Competition | 0.09 | 1.02 | 1.67 | 324.00 | 0.10 |
| Health Pressures | -0.27 | 0.88 | -5.58 | 324.00 | 0.00* |
| Ill Health Avoidance | -0.09 | 1.08 | -1.48 | 324.00 | 0.14 |
| Positive Health | -0.21 | 0.94 | -3.97 | 324.00 | 0.00* |
| Weight Management | -0.22 | 0.91 | -4.46 | 324.00 | 0.00* |
| Appearance | -0.12 | 0.86 | -2.59 | 324.00 | 0.01** |
| Strength & Endurance | -0.13 | 1.02 | -2.39 | 324.00 | 0.02** |
| Nimbleness | -0.14 | 1.06 | -2.30 | 324.00 | 0.02** |

*Note.* *indicates significance at 0.01. **indicates significance at 0.05

Further analysis was performed to determine if any significant differences existed between males and females. SPSS was used to determine mean difference from pretest to posttest for each scale (Pre "subscale" - Post "subscale" = Mean difference). Independent samples t-tests were performed for each of the fourteen subscales and evaluated for significance. Four of the fourteen subscales showed significant differences in means between males and females. "Stress management" showed a difference between males ($M$ = 0.02, $SD$ = 0.89) and females ($M$ = -0.31, $SD$ = 1.05), $t(323) = 2.82$, $p < .05$. "Enjoyment" showed a difference between males ($M$ = 0.22, $SD$ = 0.85) and females ($M$

= -0.19, *SD* = 1.03), *t*(323) = 2.97, *p* < .05. "Challenge" showed a difference between males (*M* = 0.16, *SD* = 1.11) and females (*M* = -0.18, *SD* = 0.96), *t*(323) = 2.83, *p* < .05. "Strength and endurance" showed a difference between males (*M* = 0.08, *SD* = 0.75) and females (*M* = -0.24, *SD* = 1.11), *t*(323) = 2.70, *p* < .05. (see Table 24).

Table 24

*Subscale change in means between genders*

| | *t* | *df* | Sig. (2-tailed) | Mean Difference | SD |
|---|---|---|---|---|---|
| Stress Management | 2.82 | 323 | 0.01* | 0.33 | 0.12 |
| Revitalization | 1.70 | 323 | 0.09 | 0.19 | 0.11 |
| Enjoyment | 2.97 | 323 | 0.00* | 0.34 | 0.11 |
| Challenge | 2.83 | 323 | 0.01* | 0.34 | 0.12 |
| Social Recognition | -0.30 | 323 | 0.77 | -0.03 | 0.10 |
| Affiliation | 0.43 | 323 | 0.67 | 0.05 | 0.13 |
| Competition | 0.93 | 323 | 0.36 | 0.11 | 0.12 |
| Health Pressures | 0.86 | 323 | 0.39 | 0.09 | 0.10 |
| Ill Health Avoidance | -0.45 | 323 | 0.65 | -0.06 | 0.13 |
| Positive Health | 2.61 | 323 | 0.01* | 0.29 | 0.11 |
| Weight Management | -0.94 | 323 | 0.35 | -0.10 | 0.11 |
| Appearance | -1.06 | 323 | 0.29 | -0.11 | 0.10 |
| Strength and Endurance | 2.70 | 323 | 0.01* | 0.32 | 0.12 |
| Nimbleness | 1.48 | 323 | 0.14 | 0.18 | 0.12 |

*Note.* *indicates significance at 0.01. **indicates significance at 0.05

Based on the results of the *t*-tests, the following null hypotheses were rejected:

1. The COVID-19 pandemic did not influence primary motivation factors.
2. The COVID-19 pandemic did not influence groups' motivation factors differently.

# CHAPTER V

# DISCUSSION

This study was designed to examine the impact of the COVID-19 pandemic on exercise motivation. The two research questions that directed the study were: “Did the COVID-19 pandemic significantly influence primary exercise motivation factors?” and “Did respondents with similar motivation factors share any other characteristics?”. Based on the literature, the first hypothesis stated that the data from the survey would show that the COVID-19 pandemic influenced exercise motivation factors. The second hypothesis, based on previous research, stated that groups would report different changes in exercise motivation factors. The fourteen subscales of exercise motivation that were investigated were stress management, revitalization, enjoyment, challenge, social recognition, affiliation, competition, health pressures, ill-health avoidance, positive health, weight management, appearance, strength and endurance, and nimbleness (Markland & Ingledew, 1997). For this research, 325 individuals completed retrospective pretest and posttest EMI-2 questionnaires. The retrospective pretest EMI-2 had the respondents

complete the fifty-one statements of the survey with “Prior to the COVID-19 pandemic, I exercise (or might exercise)” added before all of the survey statements. The retrospective pretest was immediately followed by the fifty-one-item posttest. For the purpose of the posttest, all fifty-one statements were preceded by the phrase “Since the start of the COVID Pandemic, I exercise (or might exercise)”.

**College Students**

As mentioned previously, the college years are a time when individuals adopt many behaviors that will stay with them for the rest of their lives (Ebben & Brudzynski, 2008). Making decisions that will have a lasting impact on health are among those behavior adoptions. This present study provides the potential for health and fitness practitioners on college campuses to help students make positive health changes instead of negative. Many times, fitness directors at college campuses are tasked with rolling out health and wellness initiatives targeted at engaging as many college students as possible (Kilpatrick, Hebert, & Bartholomew, 2005). While that is a positive goal, this study suggests that those fitness directors, like other practitioners, should take a much more individualistic, multi-faceted approach in order to target aa variety of motivation factors and maximize participation and retention. Rolling out an initiative that targets improving physical appearance may be successful for students who are motivated by physical appearance. However, students who exercise as a means of stress management may not see the same benefits or participate as regularly because the intervention does not cater to their exercise motivations. Understanding distinct exercise motivators of college students could have a significant impact not only on their time in college but a global impact as those students move in to the workforce. Helping students understand exercise motivation

can help produce greater exercise adherence which can help produce a healthier and more productive workforce for years to come. Additionally, practitioners should also keep in mind changing motivations based on external factors that can have a decided effect on motivations.

**Theoretical Implications**

The present study was built on the foundation of the Health Belief Model (Glanz, Rimer, & Lewis, 2008). The Health Belief Model is a powerful theory for encouraging and facilitating behavior change, especially concerning exercise behavior. The first construct of the Health Belief Model is perceived susceptibility that was and remains a key component of the COVID-19 pandemic. People only modified their behavior if they felt they were susceptible to contracting COVID-19. The second and third constructs of perceived risk and perceived benefits also weighed heavily on an individual's decision to modify behavior. People did not automatically modify their behavior if felt they were susceptible to COVID-19, but they also needed to weigh the risks and rewards of many behaviors. One such decision informed whether the benefits of going to the gym to workout outweighed the risk of going out in public in the middle of a pandemic.

The COVID-19 pandemic confronted individuals with the final three constructs of the Health Belief Model as well. Perceived barriers was represented by stay-at-home and quarantine orders that prevented people from working out in their usual fitness center. Once fitness centers reopened, people were confronted by the cues to action construct. Even though fitness centers reopened, not all people returned to their regular, pre-COVID habits. It became important for the health and wellness field to provide information regarding safe exercise practices, promote awareness of individual responsibility, and

communicate helpful reminders about the importance of returning to exercise behaviors. Self-efficacy is the final construct of the Health Belief Model and was vital to ensuring success in the return to regular exercise. As people returned to their previous exercise behaviors, they could slowly became more confident each time that they worked out in public, as they developed the confidence that they were able to successfully return to said behaviors.

Furthermore, a common theme throughout the COVID-19 pandemic when considering the six constructs of the Health Belief Model is that motivation played a major role in each of the constructs. Like any other health condition, the Health Belief Model can be closely tied to the COVID-19 pandemic and its impact on health behaviors. Similarly, exercise motivation is inextricably linked to the Health Belief Model. Acknowledging the reality of each of the constructs of the model is not simply enough to facilitate behavior change. This present study suggests that even in the face of a global pandemic, exercise motivation is a powerful tool to wield to promote healthy behaviors in conjunction with an awareness of the constructs of the Health Belief Model.

**Exercise Motivation**

In the beginning of the COVID-19 pandemic, many people were keenly aware of the increased pressure of negative health outcomes thanks to the constant barrage of health statistics in the media. At the same time, there was a drastic drop in physical exercise and an increase in sedentary behavior because of quarantines, and stay at home orders, that led many people to put on extra weight (Chtourou et al., 2020). Similarly, many people saw stress levels increase because of the anxiety surrounding COVID-19 and the loss of normal coping mechanisms and social interaction (Matias et al., 2020). As

months passed by during the COVID-19 pandemic, the medical community better understood the importance of exercise and healthy behaviors on mitigation of symptoms and severity of COVID-19 and began to promote that information to the public (Jakobsson et al., 2020; Jimenez et. Al, 2020).

The results of this study suggest that the COVID-19 pandemic significantly affected primary exercise motivations. Results indicate a significant change in eight of the fourteen exercise motivation subscales of the EMI-2. Four of the eight were significant with $p < .001$; "health pressures", "weight management", "stress management", and "positive health". These findings are consistent with trends identified through COVID-19 research (Pu et al., 2020).

**Group Differences**

According to previous research, males and females were expected to report significantly different exercise motivations (Egli, Bland, Melton, and Czech, 2011; Kilpatrick, Hebert, & Bartholomew, 2005). Similarly, the present study expected to see significantly different pretest-posttest changes over time for exercise motivation between males and females. The results of the present study found significant differences in means between males and females across four of the fourteen subscales. "Stress management" as an exercise motivator decreased for the males while it increased for the females. "Enjoyment" decreased for the males while it increased for the females. "Challenge" increased for the males while it increased for the females. "Strength and endurance" decreased for the males while it increased for the females. These differences between genders are consistent with previous research and support the need for varied exercise interventions.

**Limitations and Future Studies**

The major limitation of this study was the retrospective nature of the pretest. Although, retrospective pretests have been shown to be a reliable survey strategy, it is difficult to appropriately recall answers corresponding to a time months past. However, the retrospective pretest-posttest was the only design available due to the rapid onset of the COVID-19 pandemic. It is possible that if the respondents answered the same questions in real time before the start of the pandemic, the answers could have been different.

Despite the significant results of the current study, the results only demonstrate that differences exist in exercise motivation from before and after the beginning of the COVID-19 pandemic and between genders. The addition of a system of analysis to identify and quantify why those differences exist could be a valuable addition to a future study. Additionally, gathering more extensive demographic information could be valuable to identify further trends in motivation among groups. One such distinction considers the variety of respondents in this study as a representation of college campuses at large. This present study included students, faculty, and staff of a major college campus. Identifying the trend differences between these groups could have a profound impact on application. Accounting for and evaluating how faculty and staff are motivated in comparison to students could help to inform employee wellness programs differently than student health promotion programs, Therefore, appropriately distinguishing thoses groups during future research should be considered. Lastly, gathering information related to exercise patterns and fitness levels of respondents could be valuable to intervention development.

## Conclusion

The current study showed significant differences in exercise motivation from before and after the beginning of the COVID-19 pandemic. Results confirm the subjective nature of exercise motivation as it relates to genders. Simply developing an personal or public exercise intervention from a "one size fits all" perspective is not going to produce consistent results across a population. This study is consistent with previous research that suggests primary exercise motivators are dynamic and unique to an individual (Ebben & Brudzynski, 2008). Even when considering the onset of a global pandemic, people report different motivations to exercise. This current study also supports previous research that suggests that exercise motivations can change and evolve over time in response to age, sickness, or any other life-changing events (Smith, Handley, and Eldredge, 1998). Different times in a person's life may call for different approaches to exercise in order to promote successful adherence to a plan. Realizing and viewing exercise motivators as unique to an individual could have profound effects on health and wellness. Exercise practitioners and providers could benefit from understanding that major life events can have significant impacts on exercise motivations.

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# APPENDICES

# Appendix A

**The Exercise Motivations Inventory - 2 (EMI-2)**

On the following pages are a number of statements concerning the reasons people often give when asked why they exercise. *Whether you currently exercise regularly or not,* please read each statement carefully and indicate, by circling the appropriate number, whether or not each statement *is true* for you personally, *or would be true* for you personally if you did exercise. If you do not consider a statement to be true for you at all, circle the '0'. If you think that a statement is very true for you indeed, circle the '5'. If you think that a statement is partly true for you, then circle the '1', '2', '3' or '4', according to how strongly you feel that it reflects why you exercise or might exercise.

Remember, we want to know why *you personally* choose to exercise or might choose to exercise, not whether you think the statements are good reasons for *anybody* to exercise.

It helps us to have basic personal information about those who complete this questionnaire. We would be grateful for the following information:

**Your age …… years** **Your gender …… male/female**

| | | Not at all true for me | | | | | Very true for me |
|---|---|---|---|---|---|---|---|
| **Personally, I exercise (or might exercise) …** | | | | | | | |
| 1 | To stay slim | 0 | 1 | 2 | 3 | 4 | 5 |
| 2 | To avoid ill-health | 0 | 1 | 2 | 3 | 4 | 5 |
| 3 | Because it makes me feel good | 0 | 1 | 2 | 3 | 4 | 5 |
| 4 | To help me look younger | 0 | 1 | 2 | 3 | 4 | 5 |
| 5 | To show my worth to others | 0 | 1 | 2 | 3 | 4 | 5 |
| 6 | To give me space to think | 0 | 1 | 2 | 3 | 4 | 5 |

| | Personally, I exercise (or might exercise) ... | Not at all true for me | | | | | Very true for me |
|---|---|---|---|---|---|---|---|
| 7 | To have a healthy body | 0 | 1 | 2 | 3 | 4 | 5 |
| 8 | To build up my strength | 0 | 1 | 2 | 3 | 4 | 5 |
| 9 | Because I enjoy the feeling of exerting myself | 0 | 1 | 2 | 3 | 4 | 5 |
| 10 | To spend time with friends | 0 | 1 | 2 | 3 | 4 | 5 |
| 11 | Because my doctor advised me to exercise | 0 | 1 | 2 | 3 | 4 | 5 |
| 12 | Because I like trying to win in physical activities | 0 | 1 | 2 | 3 | 4 | 5 |
| 13 | To stay/become more agile | 0 | 1 | 2 | 3 | 4 | 5 |
| 14 | To give me goals to work towards | 0 | 1 | 2 | 3 | 4 | 5 |
| 15 | To lose weight | 0 | 1 | 2 | 3 | 4 | 5 |
| 16 | To prevent health problems | 0 | 1 | 2 | 3 | 4 | 5 |
| 17 | Because I find exercise invigorating | 0 | 1 | 2 | 3 | 4 | 5 |
| 18 | To have a good body | 0 | 1 | 2 | 3 | 4 | 5 |
| 19 | To compare my abilities with other peoples' | 0 | 1 | 2 | 3 | 4 | 5 |
| 20 | Because it helps to reduce tension | 0 | 1 | 2 | 3 | 4 | 5 |
| 21 | Because I want to maintain good health | 0 | 1 | 2 | 3 | 4 | 5 |
| 22 | To increase my endurance | 0 | 1 | 2 | 3 | 4 | 5 |
| 23 | Because I find exercising satisfying in and of itself | 0 | 1 | 2 | 3 | 4 | 5 |

| | | Not at all true for me | | | | | Very true for me |
|---|---|---|---|---|---|---|---|
| **Personally, I exercise (or might exercise) ...** | | | | | | | |
| 24 | To enjoy the social aspects of exercising | 0 | 1 | 2 | 3 | 4 | 5 |
| 25 | To help prevent an illness that runs in my family | 0 | 1 | 2 | 3 | 4 | 5 |
| 26 | Because I enjoy competing | 0 | 1 | 2 | 3 | 4 | 5 |
| 27 | To maintain flexibility | 0 | 1 | 2 | 3 | 4 | 5 |
| 28 | To give me personal challenges to face | 0 | 1 | 2 | 3 | 4 | 5 |
| 29 | To help control my weight | 0 | 1 | 2 | 3 | 4 | 5 |
| 30 | To avoid heart disease | 0 | 1 | 2 | 3 | 4 | 5 |
| 31 | To recharge my batteries | 0 | 1 | 2 | 3 | 4 | 5 |
| 32 | To improve my appearance | 0 | 1 | 2 | 3 | 4 | 5 |
| 33 | To gain recognition for my accomplishments | 0 | 1 | 2 | 3 | 4 | 5 |
| 34 | To help manage stress | 0 | 1 | 2 | 3 | 4 | 5 |
| 35 | To feel more healthy | 0 | 1 | 2 | 3 | 4 | 5 |
| 36 | To get stronger | 0 | 1 | 2 | 3 | 4 | 5 |
| 37 | For enjoyment of the experience of exercising | 0 | 1 | 2 | 3 | 4 | 5 |
| 38 | To have fun being active with other people | 0 | 1 | 2 | 3 | 4 | 5 |

**Please Turn Over**

| | | Not at all true for me | | | | | Very true for me |
|---|---|---|---|---|---|---|---|
| **Personally, I exercise (or might exercise) ...** | | | | | | | |
| 39 | To help recover from an illness/injury | 0 | 1 | 2 | 3 | 4 | 5 |
| 40 | Because I enjoy physical competition | 0 | 1 | 2 | 3 | 4 | 5 |
| 41 | To stay/become flexible | 0 | 1 | 2 | 3 | 4 | 5 |
| 42 | To develop personal skills | 0 | 1 | 2 | 3 | 4 | 5 |
| 43 | Because exercise helps me to burn calories | 0 | 1 | 2 | 3 | 4 | 5 |
| 44 | To look more attractive | 0 | 1 | 2 | 3 | 4 | 5 |
| 45 | To accomplish things that others are incapable of | 0 | 1 | 2 | 3 | 4 | 5 |
| 46 | To release tension | 0 | 1 | 2 | 3 | 4 | 5 |
| 47 | To develop my muscles | 0 | 1 | 2 | 3 | 4 | 5 |
| 48 | Because I feel at my best when exercising | 0 | 1 | 2 | 3 | 4 | 5 |
| 49 | To make new friends | 0 | 1 | 2 | 3 | 4 | 5 |
| 50 | Because I find physical activities fun, especially when competition is involved | 0 | 1 | 2 | 3 | 4 | 5 |
| 51 | To measure myself against personal standards | 0 | 1 | 2 | 3 | 4 | 5 |

**Thank you for completing this questionnaire**

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# Appendix B

## The Exercise Motivations Inventory - 2 (EMI-2)

## Scoring Key

**Scale scores are obtained by calculating means of the appropriate items**

| Scale | Items | | | |
|---|---|---|---|---|
| **Stress Management** | **6** | **20** | **34** | **46** |
| **Revitalisation** | **3** | **17** | **31** | |
| **Enjoyment** | **9** | **23** | **37** | **48** |
| **Challenge** | **14** | **28** | **42** | **51** |
| **Social Recognition** | **5** | **19** | **33** | **45** |
| **Affiliation** | **10** | **24** | **38** | **49** |
| **Competition** | **12** | **26** | **40** | **50** |
| **Health Pressures** | **11** | **25** | **39** | |
| **Ill-Health Avoidance** | **2** | **16** | **30** | |
| **Positive Health** | **7** | **21** | **35** | |
| **Weight Management** | **1** | **15** | **29** | **43** |
| **Appearance** | **4** | **18** | **32** | **44** |
| **Strength & Endurance** | **8** | **22** | **36** | **47** |
| **Nimbleness** | **13** | **27** | **41** | |

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